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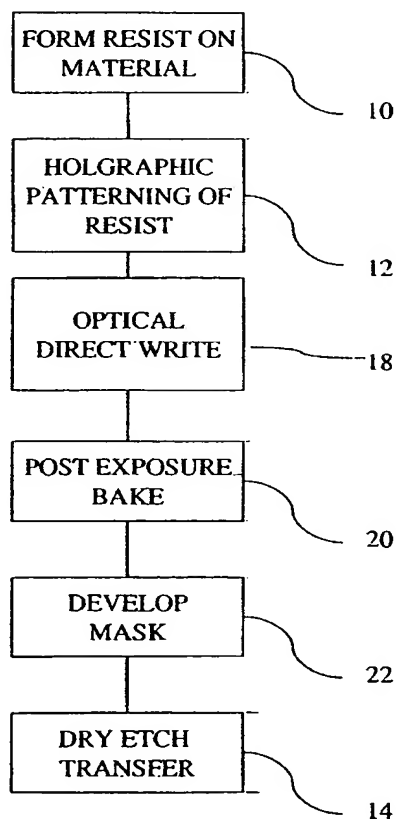
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(54) Title: **HOLOGRAPHICALLY DEFINED SURFACE MASK ETCHING METHOD AND ETCHED OPTICAL STRUCTURES**



(57) Abstract: The invention is directed to a method for etching a solid state material to create a surface relief pattern. A resist layer is formed on the surface of the solid state material. The photoresist layer is holographically patterned to form a patterned mask. The pattern is then transferred into the solid state material by a dry etching process. The invention is especially useful for forming optical nanostructures. In preferred embodiments, a direct write process, such as ebeam lithography, is used to define defects and functional elements, such as waveguides and cavities.